ROLL NO. _____

Code: DE54/DE104 **Subject: ENGINEERING MATERIALS**

DipIETE – ET (Current & New Scheme)

Time: 3 Hours **DECEMBER 2018** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. Ferro-electric materials are characterized by
(A) Very high degree of polarization
(B) A sharp dependence of polarization on temperature
(C) Non-linear dependence of the charges Q on the applied voltage
(D) All of these

b. Break down in dielectric may be
(A) Electrical breakdown **(B)** Thermal breakdown
(C) Electrochemical breakdown **(D)** Any of the above

c. It is possible to destroy super –conductivity by
(A) Reducing temperature **(B)** Adding impurities
(C) Application of magnetic field **(D)** Any of these

d. Non-linear resistor
(A) Results in non-uniform heating
(B) Follows ohm's law at low temperature only
(C) Produces harmonic distortion
(D) None of these

e. Which type of electron pair occurs in a semi- conductor?
(A) Ionic **(B)** Non-ionic
(C) Homopolar **(D)** Hetropolar

f. The electric breakdown strength of a material depends on its
(A) Composition **(B)** Thickness
(C) Moisture current **(D)** All of these

g. Thermocouple works on which of the following effects?
(A) Thomoson effect **(B)** Seeback effect
(C) Peltier effect **(D)** Joule effect

h. Variable resistors are generally
(A) Carbon resistor **(B)** Thin film resistor
(C) Thick film resistor **(D)** Wire wound resistor

i. In a reverse biased P-N junction, the current through the junction increases abruptly at
(A) Zero Voltage **(B)** 1.2 V
(C) 0.72 V **(D)** Breakdown voltage

j. Ferrite is associated with
(A) Ferromagnetic **(B)** Paramagnetic materials
(C) Diamagnetic materials **(D)** Ferrimagnetic materials

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain the effect of temperature on electrical conductivity of metals. **(8)**

b. What are the factors which affect the resistivity of Electrical Materials. **(8)**

Q.3 a. What is ploarization? Explain ionic & oriental polarization. **(8)**

b. Explain the effect of dielectric on the behavior of a capacitor. **(8)**

Q.4 a. What is Ferro electricity? Explain in brief. **(8)**

b. Explain the term dielectric losses and dielectric constant. **(8)**

Q.5 a. What are ferrites? Give their properties and application. **(8)**

b. Give the application and properties of silicon iron alloy and nickel iron alloy. **(8)**

Q.6 a. Classify the materials based on the energy band and explain them. **(8)**

b. Explain the term mobility doping, ion implantation and metallization. **(8)**

Q.7 a. Explain zener and avalanche breakdown. **(8)**

b. Explain the following: **(8)**
(i) Thermister
(ii) Wire wound resistors

Q.8 a. What are the different type of capacitors? Explain in brief. **(8)**

b. What is voltage sensitive resistor? What are the different types of voltage sensitive resistors? **(8)**

Q.9 a. Explain distinguishing properties of FET from bipolar transistors. **(8)**

b. Describe diffused junction technique of fabrication of transistors in brief. **(8)**